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Revision 0

Action Memorandum for the Non-Time Critical Removal Action for the 224-B Plutonium Concentration Facility

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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TABLES

ACRONYMS

224-B Facility	224-B Plutonium Concentration Facility and B Plant Construction Laydown Yard
ACM	asbestos-containing material
ALARACT	As Low As Reasonably Achievable Control Technology
ARAR	applicable or relevant and appropriate requirement
BARCT	best available radionuclide control technology
CERCLA	*Comprehensive Environmental Response, Compensation and Liability Act of 1980*
CFR	Code of Federal Regulations
CWC	Central Waste Complex
D&D	decontamination and demolition
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ESD	Explanation of Significant Differences
ETF	200 Areas Effluent Treatment Facility
LLW	low-level waste
mrem/yr	millirem per year
NCP	National Contingency Plan
OMB	U.S. Office of Management and Budget
PCB	polychlorinated biphenyl
ppm	parts per million
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
ROD	record of decision
SAP	Sampling and Analysis Plan
S&M	surveillance and maintenance
TBC	to be considered
TSCA	*Toxic Substances Control Act of 1976*
USC	United States Code
WAC	Washington Administrative Code
WIPP	Waste Isolation Pilot Plant

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ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE 224-B PLUTONIUM CONCENTRATION FACILITY

1.0 PURPOSE

The purpose of this Action Memorandum is to document approval of the proposed non-time-critical removal action described herein for the 224-B Plutonium Concentration Facility, located on the Hanford Site, Richland, Washington. The 224-B Building is located within the B Plant Complex in the 200 East Area. Highway 240 is to the southwest of the B Plant Complex, and the Columbia River is north-northwest. The 224-B Building is a deactivated plutonium concentration facility that formerly was associated with the B Plant Complex.

In addition to the 224-B Building, the area adjacent to the facility, which is identified as the B Plant Construction Laydown Yard, will be included as part of the CERCLA Removal Action. The B Plant Laydown Yard is located south of the 221-B Building in the 200 East Area of the Hanford Site. The laydown yard contains radiologically contaminated materials, equipment, mobile offices, and miscellaneous trailers. The 224-B Plutonium Concentration Facility and the additional laydown yard structures and equipment will be included as part of this response action and hereinafter, will be identified as the 224-B Facility.

This removal action minimizes the potential for a release of hazardous substances from the 224-B Facility that could adversely impact human health and the environment, is protective of site personnel and the environment, and contributes to the efficient performance of any anticipated long-term remedial actions, including any future subsurface soil remediation.

A 30-day public comment and review period was held from December 15, 2003 through January 16, 2004 on the engineering evaluation/cost analysis (EE/CA) prepared to evaluate removal action alternatives for the 224-B Facility and the administrative record. All comments received generally supported implementation of this action. Revisions to the preferred alternative to strengthen post-removal sampling and verification activities resulted in part from public comments. The comments and responses are contained in the administrative record.

2.0 SITE CONDITIONS AND BACKGROUND

The 224-B Facility is currently an inactive surplus facility, including laydown yard structures and equipment, and is administered under a surveillance and maintenance (S&M) program while awaiting disposition. The U.S. Department of Energy, Richland Operations Office (DOE-RL) has identified no further use for the 224-B Facility, making it a candidate for decontamination and demolition (D&D).

2.1 BACKGROUND

The 224-B Building was used to facilitate plutonium recovery following the reprocessing of spent nuclear fuel. The 224-B Building was used to purify and concentrate diluted plutonium nitrate solution that was the product of the 221-B (B Plant Complex) bismuth-phosphate process. The solution was transferred to the 231-Z Isolation Building. Plutonium concentration operations were performed in conjunction with B Plant Complex separations activities from approximately 1944 to 1952. The process components were

deactivated shortly thereafter. These past operations resulted in contamination throughout the process portion of the structure.

The B Plant Construction Laydown Yard has a history of contamination spread by rodents, tumbleweeds, and fruit flies. The source of contamination that lead to the 1998 fruit fly contamination event was the 241-ER-152 Diversion Box located in the laydown yard. Trailers and materials/equipment in the vicinity of this diversion box were placed within a Radiological Buffer Area (RBA) until surveys could be performed to verify the presence or absence of radiological contamination.

After the 1998 fruit fly contamination event, there were efforts to survey some of the trailers and materials/equipment within the laydown yard for reuse or excess. Specks of low-level fixed contamination were found on a small number of tools, equipment, and building surfaces. These specks are believed to be tumbleweed fragments, mouse feces, and/or fruit fly remnants.

2.2 FACILITY DESCRIPTION

The 224-B Building consists of a single canyon-type building, constructed of reinforced concrete and concrete block. The first and second floors have approximate outside dimensions of 60 meters by 18 meters. The third floor approximate outside dimension is 45 meters by 18 meters. The building is divided into two main sections along the length by concrete wall. Offices and galleries are on the one side of the dividing wall, and six processing cells, identified by letters A through F, are on the other side.

Cells A to E are three stories high (12 meters) and are separated by concrete walls. Chemical processing was performed in cells A, B, D, and E, which are similar in equipment and configuration. Cell C received dilute plutonium solutions from the 221-B building and waste that was generated within the 224-B Building. Cell C is different from cells A to E, as approximately half of cell C is a deep cell, with a floor below the other cells, with a pipe tunnel extending 10 meters from the deep cell beneath the first floor offices to a pipe encasement. Cell F was the final concentration and plutonium nitrate loadout area. Cell F is separated from the other cells by a concrete wall; only process and waste piping interconnect cell F with the other cells.

The first floor of the office and gallery portion of the building contains offices, a restroom, change room, lunchroom, and mechanical room.

The room at the west end of the building originally was used as a plutonium loadout room. This area was converted to a workshop with a large rollup door following deactivation of the 224-B Building.

The second floor gallery side was a pipe gallery for cells A to E and an operating gallery for cell F. The second floor was modified after deactivation for use as an office area and lunchrooms. The third floor gallery was the operating gallery for cells A through E and contains deactivated aqueous makeup tanks, scales, pumps, and control panels for the five cells.

During operation, the 224-B Building process tanks vented through the area stack system, but the cells exhausted through roof fans. The fan motors and blades are contaminated radiologically. The roof vents are closed, but the building is not sealed completely. The inlet air filters for the 224-B Building also could have picked up contamination from the stack. Presently, the 224-B Building is tied into the B Plant Complex canyon stack ventilation system, though the ventilation through the 224-B Building is not strong.

Three sewer systems also were used in the 224-B Building: cooling water, chemical sewer, and sanitary systems. An internal cell drainage system collected drainage in a waste receiver tank in the deep portion

Three sewer systems also were used in the 224-B Building: cooling water, chemical sewer, and sanitary systems. An internal cell drainage system collected drainage in a waste receiver tank in the deep portion of cell C. The three sewer systems currently are not in use, but may be radiologically contaminated. Rubber plugs seal some portions of the septic drain system.

The structures included for dispositioning in the B Plant Construction Laydown Yard are included in the following list:

Structure Number	Structure Type
MO-958	Mobile Trailer
MO-964	Mobile Trailer
2201B	Building
MO-967	Mobile Trailer
MO-959	Mobile Trailer
2238E	Skid Mount Shack
2240E	Trailer Skid
2251E	Trailer Skid
2254E	Building
2253E	Trailer Skid
2241B	Building
2239E	Trailer Skid
272BC	Trailer Skid
2244B	Building
2245B	Building
2247B	Building
2252E	2 Conexes and 1 Building
2200B	Building
2255EA	Building
2255E	Building
2256E	Building
2257E	Building
MO-965	Mobile Trailer

2.3 RELEASES OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE OR POLLUTANT OR CONTAMINANT

The 224-B Facility is contaminated with hazardous substances used or generated during plutonium concentration operations and radiological contamination spread through biological contact. To help identify hazardous substances, several sources of information were used, including characterization data, historical operations, process knowledge, and knowledge of the construction materials.

A description of hazardous substances is as follows.

Key radionuclide contaminants are transuranic including plutonium-239 and americium-241, and mixed fission products such as strontium-90 and cesium-137. Tritium may also be found as a sealed source within the building exit signs. The majority of contaminants, however, are found in the form of adherent

1985, a transuranics characterization was performed at the 224-B Facility in support of D&D activities. The results of this effort (SD-DD-TRP-002) are summarized in Table 2-1.

Table 2-1. Plutonium/Americium Inventory Distribution in the 224-B Facility.

Cell	Americium-241 (Ci)	Plutonium-239 (Ci)*	Plutonium-239 (g)
A	0.06	0.8	12.5
B	0.09	1.2	18.6
C	0.2	2.6	42.3
D	3.5	8.6	138.0
E	0.07	0.9	14.2
F	1.3	17.1	275.0
Total	5.22	31.2	500.0

* Plutonium-239 based on facility average plutonium-239/americium-241 mass ratio of 13.14:1.

The inventory detailed in Table 2-1 is consistent with the *224-B Facility Documented Safety Analysis* (BHI-01156) that was in effect when the EE/CA was developed. The inventory report indicates a large uncertainty exists in the inventory. Based on this uncertainty, the actual inventory could be approximately twice what is shown in Table 2-1. The source term and doses in the current documented safety analysis for 224-B Facility has been updated to the larger values to better address the uncertainty present in the inventory.

The primary contaminants of concern are radioactive materials. All known quantities of concentrated hazardous chemicals were removed during deactivation and S&M operations. Some residual quantities of hazardous chemicals might remain as hold up or heels in process lines, tanks, and vessels. In addition, the 224-B Facility is anticipated to contain one or more of the following hazardous materials found in most Hanford Site facilities:

- Polychlorinated biphenyl (PCB) ballasts
- Lead paint
- Lead for shielding
- Mercury switches, gauges, thermometers
- Mercury or sodium vapor lights
- Used oil from motors and pumps
- Unspecified chemical containers
- Friable and nonfriable forms of asbestos.

Specific chemicals used during or as part of the plutonium concentration process are listed in Table 2-2.

Table 2-2. Suspected Nonradiological Contaminants in the 224-B Facility (Source: SD-DD-PP-002).

Input Chemicals	
$BiPO_4$	Bismuth phosphate
$NaBiO_3$	Sodium metabismuthate
$Na_2Cr_2O_7 \bullet 2H_2O$	Sodium chromate
H_3PO_4	Phosphoric acid
HNO_3	Nitric acid
$La(NO_3)_5 \bullet 2NH_4NO_3 \bullet 4H_2O$	Lanthanum ammonium nitrate
$H_2C_2O_42H_2O$	Oxalic acid
HF	Hydrogen fluoride
KOH	Potassium hydroxide
$KMnO_4$	Potassium permanganate
Waste Solutions	
$BiPO_4$	Bismuth phosphate
HNO_3	Nitric acid
LaF_3	Lanthanum fluoride
KOH	Potassium hydroxide
H_3PO_4	Phosphoric acid
$NaNO_3$	Sodium nitrate
KNO_3	Potassium nitrate
$Cr(NO_3)_3$	Chromium nitrate
HF	Hydrogen fluoride
$H_2C_2O_4 \bullet 2H_2O$	Oxalic acid
$Mn(NO_3)_2$	Manganese nitrate
NH_4NO_3	Ammonium nitrate
KF	Potassium fluoride

Additional characterization will be conducted as part of the removal action activities in accordance with approved sampling and analysis plans. The additional sampling and characterization will be used to support waste designation, including possible non-destructive assay for transuranics, and to determine if the removal action objectives and stabilization requirements have been met. Characterization data will be used to support the determination on whether the remaining site should be identified as a waste site that is then incorporated into an operable unit for subsequent remedial action.

2.4 DISCUSSION OF RELEASE THREAT

The 224-B Facility is contaminated with hazardous substances, primarily a significant inventory of radionuclides (Table 2-1).

The risks to the public and the environment associated with routine S&M activities at the 224-B Facility are not quantified. However, cell radiological conditions require special precautions for entry.

The *224-B Facility Documented Safety Analysis* (BHI-01156) accident scenario indicates that a seismic event results in the doses listed below. The bounding accident scenario calculated dose consequences are as follows.

- The calculated dose at 100 m is 12.7 rem.
- The calculated dose at the Columbia River [11.3 kilometers (km) away] is less than 0.009 rem.

The inhalation and ingestion pathways also are of concern if the material within the cell processing equipment and piping is disturbed. During canyon cell area D&D activities, the potential for radiological doses to personnel and the environment is considered to be a significant risk. D&D activities include process cell equipment dismantling (cutting process piping). Even though personal protective equipment is worn, external radionuclides exposure and inhalation still pose a risk. During initial D&D activities, the potential for a radionuclide release increases. As the inventory is stabilized and disposed appropriately, the source term (hence, the risk) decreases.

In general, an accidental radiological release (e.g., from a structural failure resulting from fire or seismic event) from the 224-B Facility increases the longer the facility remains in S&M awaiting disposition. The risk from the 224-B Facility increases with time because of the potential for inventory releases from structure degradation and the lack of a robust ventilation system and contamination spread by rodents and insects, especially in the laydown yard portion of the 224-B Facility. The external radiation, inhalation, and ingestion risks to the site workers and the public associated with the contamination under a continued S&M scenario justify a non-time-critical removal action.

2.5 OTHER ACTIONS TO DATE

D&D activities have not been undertaken for the 224-B Facility since deactivation in 1976 and radiological characterization in 1985 (RHO, 1985a) and 1998 (FH, 1999).

3.0 THREATS TO HUMAN HEALTH OR THE ENVIRONMENT

Conditions persist wherein threats to the public health or the environment exist.

The National Contingency Plan (NCP), 40 CFR, Section 300.415(b)(2), establishes factors to be considered in determining the appropriateness of a removal action. Those factors include:

- *Hazardous substances or pollutants or contamination in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.* Hazardous substances, including radioactive substances are contained within the 224-B Building pipes and process vessels. These substances pose a threat of accidental release that may result from equipment failure resulting from a seismic event.

- *Other situations or factors are present that may pose threats to public health or the environment.* Hazardous substances are present as fixed contamination within the cells, equipment and additional structures. These substances pose a threat of release as fixed contamination becomes exposed and as structural integrity is compromised, resulting in a potential direct exposure of nearby personnel and the environment, and exposure to the public through airborne radioactive contaminants. The S&M activities required to maintain confinement of the building and additional structures increasingly pose a potential exposure to the environment.

4.0 ENDANGERMENT DETERMINATION

The response action proposed is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances, including radioactive substances from the 224-B Facility into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.

5.0 PROPOSED ACTIONS AND ESTIMATED COSTS

Proposed actions and estimated costs are presented in the following sections.

5.1 PROPOSED ACTION

An engineering evaluation/cost analysis (EE/CA) was prepared to develop removal action alternatives for the 224-B Facility. The removal action alternatives evaluated for the 224-B Facility must meet the removal action objectives. The specific removal action objectives for this response action are as follows:

- Reduce or eliminate the potential for exposure to hazardous substances above levels that are protective of the public and environment
- Reduce or eliminate the potential for a release of hazardous substances
- Safely manage (treat and/or dispose) waste streams generated by the removal action
- To the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerns and ensure an orderly transition from removal to remedial response actions, including any future subsurface soil remediation.

Based on these considerations, the following four removal action alternatives are identified:

- Alternative One: No Action
- Alternative Two: Continued S&M
- Alternative Three: D&D (to grade, excluding building foundation and underlying soils/structures)
- Alternative Four: D&D (including building foundation and underlying soils/structures to 1 meter below foundation). NOTE: The foundation includes the footings of the structure.

5.1.1 Alternative One: No Action

Under the No Action alternative, access to the 224-B Facility is assumed to be unrestricted. Industrial and radiological hazards continue to exist because controls to prevent access are not maintained. Initial risks of the No Action alternative are minimal to the environment provided there are no significant seismic, weather, or fire events. Risks over time are expected to increase as deterioration of the 224-B

Facility progresses and the structural integrity is compromised. The No Action alternative does not address the hazards posed by the 224-B Facility, and the 224-B Facility continues to deteriorate. Eventually, decay is expected to result in radiological releases to the environment and potential exposure to personnel and the public. Physical hazards associated with partial structural collapse also are anticipated.

5.1.2 Alternative Two: Continued S&M

Under the Continued S&M Alternative, the 224-B Facility would remain in the S&M program until decommissioning occurs. The 224-B Facility would be maintained in a quiescent state for a considerable duration while ongoing preventive measures are implemented. These measures include periodic radiological and industrial hazard monitoring (both inside and outside of the 224-B Facility), cold weather protection, preventive maintenance, annual roof inspections, identification and minor repair of friable asbestos, and general visual inspections. Major maintenance operations, such as roof maintenance, would be performed to ensure the maintenance of safe conditions and the control of the ongoing deterioration process. Additionally, limited decontamination and fixative application occur to control the spread of radiological contamination.

The primary goal of this alternative is to prevent releases or exposures of hazardous substances. Adoption of the S&M alternative extends the life of the 224-B Facility for approximately the next 30 years, during which time deterioration progresses and unusual events (e.g., seismic) might occur. Severe weather could create conditions amenable to radiological releases, and long-term aging of confinement structures could lead to eventual failure. These conditions, accompanied by the minimum surveillance efforts conducted under S&M, could result in an unplanned radiological release.

Because minimal surveillance does not readily detect 224-B Facility decay (e.g., system corrosion or structural breakdown), preventive maintenance might not occur in time, and response actions could be required. This approach could result in the spread of contamination. An ongoing S&M program would have to become increasingly more labor intensive and incorporates periodic characterization efforts to counter these conditions. Such conditions ultimately lead to increased risk of exposure of radioactive material and contamination to personnel and the environment.

5.1.3 Alternative Three: D&D (to grade, excluding building foundation and underlying soils/structures)

This D&D alternative consists of removing the nonradiological and radiological hazardous substances from the 224-B Facility, removing equipment and associated piping, decontaminating the structure and/or stabilizing the contamination, demolishing the structure to slab, disposing of the waste generated, and stabilizing the area.

Nonradiological hazardous substances, primarily on the gallery side, would be removed. These substances include asbestos-containing material (ACM), the chemical feed tanks and piping, equipment oil, mercury, control panels, and, if any, materials/liquids in the floor drains. Radiological hazardous substances removal includes removal of the loadout hood on the west end of the first floor (cell F) and all of the canyon cell tanks and piping. Because most of the radioactive inventory exists within the process cell equipment and piping, the process cell equipment and piping would be removed completely and disposed as appropriate, either before or following the demolition. Equipment, vessels, and piping might need to be cut to facilitate removal and/or disposal. Remote handling equipment and an upgraded canyon bridge crane could be used to facilitate removal of cell equipment and piping. The door on the south side on the second floor, adjacent to cell E, would be used during D&D for material removal.

In both the 224-B Building and the B Plant Construction Laydown Yard, piping, vessels and equipment would be removed, either before or during demolition. Piping and drains entering or exiting belowgrade would be sampled, and then plugged or grouted to prevent potential pathways to the environment.

The majority of the demolition would require the use of heavy equipment (e.g., excavator with various attachments) to demolish the structure. Other industry standard practices for demolition also might be used (e.g., mechanical saws and cutting torches). The 224-B Facility would be demolished to grade, with only a slab remaining. Areas such as the pipe tunnel area in cell C that exist belowgrade would be sampled underneath the pipe tunnel and then the tunnel would be filled with grout, gravel, or other suitable material to grade level and the entire footprint of the 224-B Facility would be stabilized to prevent migration of any residual contamination to the environment.

The scope of this removal action alternative does not include soil, groundwater, or waste site remediation. Further soil or waste site remediation would be conducted in coordination with future remedial actions.

The major risks associated with this D&D alternative would be the safety of personnel involved in both the radiological aspects of the process system removal and decontamination and the industrial aspects of facility demolition/dismantlement. These risks are related to the potential release of contamination and the hazards associated with D&D activities. Risks associated with credible natural phenomenon events (e.g., seismic actions and high-velocity wind) would continue to exist until the radioactive material inventory is removed. These risks would diminish as the 224-B Facility removal activities progress and the radiological inventory is removed.

The disposal of the radioactive material inventory in the 224-B Facility and the immediate removal of the 224-B Facility and systems would be the most direct resolution of impending radiological and physical hazards. By backfilling over the belowgrade areas of the 224-B Facility and stabilizing the slab, the mobility of residual contaminants to the environment in and under the foundation would be reduced. In time, however, contaminants could still pose a risk, most likely through the groundwater transport exposure pathway. Therefore, a further action, including remedial action might be required. While concerns for operational methods and technology used may be encountered and resolved during removal actions, no major issues exist that might compromise this alternative.

5.1.4 Alternative Four: D&D (including building foundation and underlying soils/structures to 1 meter below foundation)

This alternative consists of D&D as described in Alternative 3 plus removal of the building foundation to a depth of 1 meter below the foundation and footings. In this alternative, potentially contaminated foundation, piping, drains, and surrounding soil would be removed to 1 meter below the foundation and 1 meter out from the building footprint. The resulting void space would be backfilled with clean soil.

The demolition would use heavy equipment (e.g., excavator with various attachments) to demolish the structure. Other industry standard practices for demolition also could be used (e.g., mechanical saws). Removal would include the abovegrade structure and subsurface structure and systems to a depth of 1 meter below the foundation.

Underground piping and trenches extending away from the 224-B Facility would be included only in the scope to a distance of 1 meter from the walls of the structure, although additional piping or trenches might be removed and disposed as necessary to accommodate the removal action for the structure. Contaminated and uncontaminated soil located a distance of more than 1 meter from the walls and floors of the structure might be moved or removed as necessary to implement the removal of the structures;

however, the scope of this removal action would not include any additional soil, groundwater, or waste9 site remediation beyond that described above.

The major risks associated with this alternative would be the safety of personnel involved in both the radiological aspects of the process system removal and decontamination and the industrial aspects of facility demolition and dismantlement, which would include soil excavation. These risks are related to the potential release of contamination and the hazards associated with construction activities. Risks associated with credible natural phenomenon events (e.g., seismic actions and high-velocity wind) would continue to exist until the radioactive material inventory is removed. These risks would diminish as the 224-B Facility removal progresses and the radioactive inventory is removed.

The disposal of the radioactive material inventory in the 224-B Facility and the immediate removal of the facility and systems would be the most direct resolution to impending radiological and physical hazards. Because the foundation of the structure, as well as underlying and adjacent soils, would be removed to the extent described, this alternative results in the removal of the greatest amount of contamination of the four removal action alternatives. In time, however, contaminants remaining in the soil, piping, or trenches could still pose a risk, most likely through the groundwater transport exposure pathway or by inadvertent intrusion and would need to be remediated as part of future remedial actions. While concerns for operational methods and technology use would be encountered and resolved during removal actions, no major issues exist that might compromise this alternative.

5.2 COMMON ELEMENTS

With the exception of the No Action alternative, each of the alternatives results in generation of waste. The majority of the contaminated debris likely is designated as low-level waste (LLW); however, quantities of mixed waste, dangerous waste, and transuranic waste might be generated. Waste management applicable or relevant and appropriate requirements (ARARs) are discussed in Section 5.3.

Waste generated under removal action Alternatives Two, Three, and Four would be disposed at an appropriate disposal site. Waste management is a common element among these alternatives. For each alternative, recycling and/or reuse options would be evaluated and implemented where possible to reduce the volume of material disposed.

Contaminated waste for which no reuse, recycle, or decontamination option is identified would be assigned an appropriate waste designation (e.g., solid, asbestos, PCB, radioactive, dangerous, or mixed). Most of the contaminated waste generated during implementation of these alternatives would be disposed onsite at the Environmental Restoration Disposal Facility (ERDF) in the 200 West Area. ERDF is the preferred waste disposal option because ERDF is an engineered facility that provides a high degree of protection to human health and the environment, and this disposal option is more cost effective than disposal at other disposal sites. Construction and operation of ERDF was authorized using a separate *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) *of 1980* record of decision (ROD) (EPA et al. 1995). ERDF is designed to meet *Resource Conservation and Recovery* (RCRA) *Act of 1976*, as amended, minimum technological requirements for landfills, including standards for a double liner, a leachate collection system, leak detection, monitoring, and final cover.

The U.S. Department of Energy Hanford Environmental Restoration Disposal Facility, Hanford Site, Benton County, Washington, Explanation of Significant Differences (ESD) (EPA et al. 1996) modified the ERDF ROD (EPA et al. 1995 and EPA et al. 2002) to clarify the eligibility of waste generated during cleanup on the Hanford Site. Per the ESD, ERDF is eligible for disposal of any LLW, mixed waste, and hazardous/dangerous waste generated as a result of cleanup actions (e.g., D&D waste and

investigation-derived waste), provided that the waste meets ERDF waste acceptance criteria and that appropriate CERCLA decision documents are in place.

The waste that would be generated under these alternative CERCLA removal actions falls within the definition of waste eligible for disposal at ERDF established in the ERDF ROD and subsequent ESD. Waste might require treatment to meet ERDF waste acceptance criteria or RCRA Land Disposal Restrictions. The type of treatment and the location of treatment would be conducted in accordance with an approved work plan.

While most waste that would be generated during these removal action alternatives likely meets ERDF waste acceptance criteria, some waste might not meet or might not be able to be treated to meet ERDF acceptance criteria. Specifically, this includes low-level radioactive and nonradioactive liquid waste.

Liquid waste containing levels of radioactive and/or nonradioactive hazardous substances meeting the 200 Areas Effluent Treatment Facility (ETF) waste acceptance criteria would be transferred to ETF and treated to meet ETF waste discharge criteria. Liquids that do not meet ETF waste acceptance criteria would be solidified and either disposed at ERDF (if ERDF waste acceptance criteria are met) or stored at the Central Waste Complex (CWC), subject to final disposition under CERCLA. Clean water (e.g., nonradioactive and nonhazardous) could be used for dust suppression.

Transuranic waste would be placed in interim storage at CWC and shipped offsite to the Waste Isolation Pilot Plant (WIPP) in accordance with an approved work plan and the schedule established for completing remedial actions, no later than September 30, 2024.

The ERDF is considered to be onsite for management and/or disposal of waste from removal actions proposed in this document*. There is no requirement to obtain a permit to manage or dispose of CERCLA waste at the ERDF. It is expected that the great majority of the waste generated during the removal action proposed in this document can be disposed onsite at ERDF. For waste that must be sent offsite, such as transuranic waste, EPA would make a determination in accordance with 40 Code of Federal Regulations (CFR) 300.440 as to the acceptability of the proposed site for receiving this CERCLA removal action waste.

5.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND OTHER CRITERIA, ADVISORIES, OR GUIDANCE TO BE CONSIDERED

Applicable or Relevant and Appropriate Requirements (ARARs) are defined to mean only substantive requirements. ARARs do not include administrative requirements. Furthermore, onsite CERCLA actions are exempt from obtaining federal, state, and local permits [40 CFR 300.400(e)].

* CERCLA Section 104(d)(4) states that, where two or more noncontiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the President may, at his discretion, treat these facilities as one for the purpose of this section. The preamble to the "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300) clarifies the stated EPA interpretation that when noncontiguous facilities are reasonably close to one another, and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA Section 104(d)(4) allows the lead agency to treat these related facilities as one site for response purposes and, therefore, allows the lead agency to manage waste transferred between such noncontiguous facilities without having to obtain a permit. Therefore, the ERDF is considered to be onsite for response purposes under this removal action. It should be noted that the scope of work covered in this removal action is for a facility and waste contaminated with hazardous substances. Materials encountered during implementation of the selected removal action that are not contaminated with hazardous substances will be dispositioned by DOE.

To Be Considered (TBC) information consists of nonpromulgated advisories or guidance issued by federal or state governments that are not binding legally and do not have the status of ARARs. As appropriate, TBCs should be considered in determining the removal action necessary for protection of human health and the environment. Requirements drawn from TBCs may be included in the selected alternative. Because the alternatives would result primarily in waste generation and potential for air emissions, the key ARARs identified for the alternatives considered include waste management standards; standards controlling emissions to the environment; and environment, safety, and health standards. The ARARs are discussed generally in the following sections and are documented in detail in Table 5-1.

5.3.1 Waste Management Standards

A variety of waste streams would be generated under the proposed removal action alternatives. It is anticipated that most of the waste will designate as LLW. However, quantities of transuranic waste, dangerous or mixed waste, PCB-contaminated waste, and asbestos and ACM also could be generated. The great majority of the waste will be in a solid form. However, some aqueous solutions might be generated.

Radioactive waste is governed under the authority of the *Atomic Energy Act of 1954*.

The identification, storage, treatment, and disposal of hazardous waste and the hazardous component of mixed waste are governed by RCRA. Washington State, which implements RCRA requirements under *Washington Administrative Code* (WAC) 173-303, has been authorized to implement most elements of the RCRA program. The dangerous waste standards for generation and storage apply to the management of any dangerous or mixed waste generated at the 224-B Facility. Treatment standards for dangerous or mixed waste subject to RCRA land disposal restrictions are specified in WAC 173-303-140, which incorporates 40 CFR 268 by reference.

The management and disposal of PCB waste are governed by the *Toxic Substances Control Act* (TSCA) *of 1976*, and regulations at 40 CFR 761. The TSCA regulations contain specific provisions for PCB waste, including PCB waste that contains a radioactive component. PCBs also are considered underlying hazardous constituents under RCRA and thus could be subject to WAC 173-303 and 40 CFR 268 requirements.

Removal and disposal of asbestos and ACM are regulated under the *Clean Air Act of 1977* (40 CFR 61, Subpart M) and Occupational Safety and Health Administration regulations (29 CFR 1910.1101 and WAC 296-62). These regulations provide for special precautions to prevent environmental releases or exposure to personnel of airborne emissions of asbestos fibers during removal actions. 40 CFR 61.52 identifies packaging requirements.

Waste designated as LLW that meets ERDF acceptance criteria would be disposed at ERDF, which is engineered to meet appropriate performance standards under 10 CFR 61. Waste that is designated as either contact-handled or remote-handled transuranic waste or transuranic-mixed waste would be stored at CWC and shipped offsite to WIPP in accordance with an approved work plan and a schedule established for completing remedial actions, no later than September 30, 2024. WIPP meets 40 CFR 191 requirements for transuranic waste disposal and is a RCRA-permitted disposal facility.

Waste designated as dangerous or mixed waste would be treated as appropriate to meet land disposal restrictions and ERDF acceptance criteria, and disposed at ERDF. ERDF is engineered to meet landfill design standards under WAC 173-303-665. All applicable packaging and pre-transportation requirements

for dangerous or mixed waste generated at the 224-B Facility would be identified and implemented before movement of any waste.

Some of the aqueous waste designated as LLW, dangerous, or mixed waste would be transported to ETF for treatment and disposal. ETF is a RCRA-permitted facility authorized to treat aqueous waste streams generated on the Hanford Site and dispose of these streams at a designated state-approved land disposal facility in accordance with all applicable requirements.

Waste designated as PCB remediation waste likely would be disposed at ERDF or WIPP, depending on whether the waste is a LLW or a transuranic waste respectively. All waste suspected to contain PCBs would be evaluated to determine whether the waste meets ERDF or WIPP waste acceptance criteria. Any PCB waste that does not meet ERDF or WIPP waste acceptance criteria would be retained at a PCB storage area meeting the requirements for TSCA storage, and transported for future disposal at an appropriate disposal facility.

Asbestos and ACM would be removed, packaged as appropriate, and disposed at ERDF.

CERCLA Section 104(d)(4) states that where two of more noncontiguous facilities are reasonably related on the basis of geography, or on the basis of the threat or potential threat to the public health or welfare or the environment, the facilities can be treated as one for purposes of CERCLA response actions. Consistent with this, the 224-B Facility and ERDF are considered to be onsite for purposes of Section 104 of CERCLA, and waste may be transferred between the facilities without requiring a permit.

All alternatives will be performed in compliance with all waste management ARARs. All waste streams will be evaluated, designated, and managed in compliance with the ARAR requirements. Before disposal, waste will be managed in a protective manner to prevent releases to the environment or unnecessary exposure to personnel.

5.3.2 Standards Controlling Emissions to the Environment

The proposed removal action alternatives have the potential to generate both radioactive and nonradioactive airborne emissions.

The federal *Clean Air Act* and the "Washington Clean Air Act" (*Revised Code of Washington* [RCW] Chapters 70.94 and 43.21) regulate both toxic and radioactive airborne emissions. Under implementing regulations found in 40 CFR 61, Subpart H, and WAC 246-247, radionuclide airborne emissions from all combined operations on the Hanford Site can not exceed 10 millirem per year (mrem/yr) effective dose equivalent to the hypothetical offsite maximally exposed individual. The WAC 246-247 also requires verification of compliance, typically through periodic confirmatory air sampling. Any potential for a nonzero radioactive emission requires use of best available radionuclide control technology (BARCT) or as low as reasonably achievable control technology (ALARACT). The potential to emit would be calculated before starting the removal action, and a monitoring plan developed and implemented as appropriate.

WAC 173-400 and 173-460 establish requirements for emissions of nonradionuclide air pollutants. The primary source of nonradionuclide emissions is fugitive dust, which is regulated under WAC 173-400-040(3). Fugitive emissions would be controlled through standard industrial practices such as application of water spray and fixatives and temporary confinement enclosures/glovebag containments. Alternatives Two through Four are expected to comply with these standards.

5.3.3 Safety and Health Standards

The DOE requirements for personnel protection from radiation hazards are specified in "Occupational Radiation Protection" (10 CFR 835). This regulation establishes radiation protection standards, limits, and program requirements for protecting personnel from ionizing radiation. The regulation also requires that measures be taken to maintain radiation exposures as low as reasonably achievable.

Under Alternatives Two through Four, radiological and physical hazards would be identified and analyzed before the start of activities. Appropriate mitigation measures would be addressed in a site-specific health and safety plan. All alternatives are expected to comply with these standards. A combination of personal protective equipment, personnel training, and administrative controls (e.g., limiting time in and distance from radiation zones) would be used to ensure that the requirements for personnel and visitor protection are met. Individual monitoring would be performed as necessary to verify compliance with the requirements. Because Alternative Two extends over a longer time but involves a lower potential for incidences to occur in the near term, it is uncertain whether Alternative Two performs better or worse than the other alternatives.

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the 224-B Facility.

ARAR citation	ARAR or TBC	Requirement	Rationale for use
WASTE MANAGEMENT STANDARDS			
Regulations pursuant to the RCRA, 42 *United States Code* (USC) 6901, et seq. – Implemented through the *Hazardous Waste Management Act*, RCW 70.105			
Dangerous Waste Regulations, (WAC 173-303):			
Solid Waste Identification Specific subsections: WAC 173-303-016 WAC 173-303-017	ARAR	These regulations define how to identify when materials are and are not solid waste	These regulations are applicable because materials will be generated and they define how to determine which materials are subject to the designation regulations.
Incorporation of EPA Regulations By Reference Specific subsection: WAC 173-303-045	ARAR	This regulation clarifies that reference in WAC 173-303 or 40 CFR Parts 260 through 280 and Part 124 refer to those rules in existence on July 1, 1999. This regulation also clarifies which portions of the regulations are not incorporated or adopted by reference because these are provisions that EPA can not delegate to states.	This regulation clarifies how reference to federal RCRA regulations is implemented.
Dangerous/Mixed Waste Designation Specific subsections: WAC 173-303-070 WAC 173-303-071 WAC 173-303-080 WAC 713-303-081 WAC 173-303-082 WAC 173-303-083 WAC 173-303-090 WAC 173-303-100 WAC 173-303-110	ARAR	These regulations define the procedures to be used to determine if solid waste requires management as dangerous waste. The regulations identify which waste codes are appropriate for application to the waste.	These regulations are applicable to solid waste generated during removal action.

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the 224-B Facility.

ARAR citation	ARAR or TBC	Requirement	Rationale for use
Dangerous/Mixed Waste Management Specific subsections: WAC 173-303-073 WAC 173-303-077 WAC 173-303-170(3)	ARAR	These regulations establish the management standards for solid waste designated as dangerous or mixed waste. Special waste is addressed in WAC 173-303-073. Universal waste is addressed in WAC 173-303-077. Generator standards are addressed in -170 and -200.	These regulations are applicable to the management of materials subject to WAC 173-303. Specifically, the standards for management of special waste and universal waste and the standards for management of dangerous/mixed waste are applicable to the interim management of certain waste that will be generated during the removal action. WAC 173-303-170(3) includes the provisions of WAC 173-303-200 by reference. WAC 173-303-200 further includes certain standards from WAC 173-303-630 and -640 by reference.
Dangerous/Mixed Waste Disposal Specific subsections: WAC 173-303-140	ARAR	This regulation establishes state standards for land disposal of dangerous waste and incorporates by reference federal land disposal restrictions of 40 CFR 268 that are applicable to solid waste that designates as dangerous or mixed waste in accordance with WAC 173-303-070.	This regulation is applicable to dangerous/mixed waste generated from removal action destined for onsite land disposal.
Recycling Requirements Specific subsections: WAC 173-303-120(3) WAC 173-303-120(5)	ARAR	These regulations define the requirements for the recycling of materials that are a solid and a dangerous waste. Specifically, WAC 173-303-120(3) provides for management of certain recyclable materials, including spent refrigerants, antifreeze, and lead-acid batteries. WAC 173-303-120(5) provides for the recycling of used oil.	These regulations are applicable for the onsite management of materials, such as antifreeze and used oil that will be generated during removal action. Such materials can be recycled and/or conditionally excluded from certain dangerous waste requirements.
Regulations pursuant to the *Toxic Substances Control Act (TSCA)*, 15 USC 2601 et seq.			
Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Provisions (40 CFR 761)			
PCB Waste Management and Disposal Specific subsections: 40 CFR 761.50(b)(1) 40 CFR 761.50(b)(2) 40 CFR 761.50(b)(3) 40 CFR 761.50(b)(4) 40 CFR 761.50(b)(7) 40 CFR 761.50(c)	ARAR		These regulations are applicable to the onsite storage and disposal of PCB liquids, items, remediation waste, and bulk product waste at >50 ppm. The specific identified subsections from 40 CFR 761.50(b) reference the specific sections for management of each PCB waste type. Radioactive PCB waste can be disposed in accordance with 40 CFR 761.50(b)(7).

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the 224-B Facility.

ARAR citation	ARAR or TBC	Requirement	Rationale for use
Regulations pursuant to the *Solid Waste Management, Recovery and Recycling Act*, RCW 70.95			
"Minimum Functional Standards for Solid Waste Handling," (WAC 173-304)			
Nondangerous, Nonradioactive Solid Waste Management Specific subsections: WAC 173-304-190 WAC 173-304-200 WAC 173-304-350	ARAR	These regulations establish requirements for the management of solid waste that is not dangerous or radioactive waste. Affected solid waste includes garbage, industrial waste, construction waste, and ashes. Requirements for containerized storage, collection, transportation, treatment, and disposal of solid waste are included.	These regulations are applicable to onsite management and disposal of nondangerous, nonradioactive solid waste that could be generated during removal action.
To-Be-Considered pursuant to relevant facility acceptance criteria			
Environmental Restoration Disposal Facility Waste Acceptance Criteria (BHI-00139)	TBC	This document establishes waste acceptance criteria for ERDF.	Waste destined for management at ERDF must meet acceptance criteria to ensure proper disposal.
STANDARDS CONTROLLING EMISSIONS TO THE ENVIRONMENT			
Regulations pursuant to the *Clean Air Act of 1977*, 42 USC 7401, et seq.			
"National Emission Standards for Hazardous Air Pollutants" (40 CFR 61)			
Emissions of Hazardous Air Pollutants Specific subsections: 40 CFR 61.01 40 CFR 61.05 40 CFR 61.12 40 CFR 61.14 40 CFR 61.92 40 CFR 61.145(a)(1) 40 CFR 61.145(a)(5) 40 CFR 61.145(c) 40 CFR 61.150(a) 40 CFR 61.150(b) 40 CFR 61.150(c)	ARAR	These regulations establish emission standards for hazardous air pollutants including radionuclides (except radon) and asbestos. These regulations provide general requirements and listings for regulated emissions at a regulated facility. 40 CFR 61.92 sets limits for emissions of radionuclides from the entire facility to ambient air. Radionuclide emissions can not exceed those amounts that would cause any member of the public to receive an effective dose equivalent of 10 mrem/yr. The definition of facility includes all buildings, structures, and operations at one contiguous site. The requirements also set standards to ensure that emissions from asbestos are minimized during collection, processing, packaging, and transportation. These regulations define regulated asbestos-containing materials and establish removal requirements based on quantity present and handling requirements. These regulations also specify handling and disposal requirements for regulated sources having the potential to emit asbestos.	These regulations are applicable to the Hanford Site because there is potential to emit radionuclides to unrestricted areas. Radionuclide emissions from activities associated with the removal action must be controlled and monitored.

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the 224-B Facility.

ARAR citation	ARAR or TBC	Requirement	Rationale for use
Regulations pursuant to the *Washington Clean Air Act*, RCW 70.94 / *Washington State Department of Ecology*, RCW 43.21A			
"Radiation Protection - Air Emissions," (WAC 246-247)			
Radionuclide Emission Standards Specific subsections: WAC 246-247-120 WAC 246-247-130	ARAR	These regulations establish limits for airborne radionuclide emissions as defined in WAC 173-480 and 40 CFR 61, Subparts H and I. The ambient air standards under WAC 173-480 require that the most stringent standard be enforced. Ambient air standards under 40 CFR 61, Subparts H and I, are not to exceed amounts that result in an effective dose equivalent of 10 mrem/yr to any member of the public. These standards specify emission monitoring requirements and the application of BARCT requirements.	These regulations are applicable because these set emission limits and use of BARCT or ALARACT for airborne radionuclides.
"General Regulations for Air Pollution," (WAC 173-400)			
Air Contaminant Emission Standards Specific subsections: WAC 173-400-040 WAC 173-400-075	ARAR	These regulations require that reasonable precautions be taken to prevent the release of air contaminants associated with fugitive emissions resulting from materials handling, construction, demolition, or other operations. Emission standards are identified for visible, particulate, fugitive, odors, and hazardous air emissions. The regulations require that source testing and monitoring be performed.	Requirements of these regulations are applicable to removal actions performed at the site that could result in the emission of hazardous air pollutants (e.g., fugitive dust). Substantive standards established for the control and prevention of air pollution under these regulations might be applicable during the removal action.
"Controls for New Sources of Air Pollution," (WAC 173-460)			
Controls for New Sources of Toxic Air Pollutants Specific subsection: WAC 173-460-040	ARAR	This regulation requires that new sources of air emissions provide emission estimates for toxic air contaminants listed in the regulation. The standard requires that emissions be quantified and used in risk modeling to evaluate ambient impacts and establish acceptable source impact levels. The standard establishes three major requirements for new sources of air pollutants: use of best available control technology, quantification of toxic emissions, and demonstration that human health is protected.	This regulation is applicable to removal actions performed at the site, if a treatment technology that emits toxic air emissions were necessary during the implementation of the removal action.

Table 5-1. Identification of Applicable or Relevant and Appropriate Requirements and To Be Considered Information for the 224-B Facility.

ARAR citation	ARAR or TBC	Requirement	Rationale for use
"Ambient Air Quality Standards and Emission Limits for Radionuclides," (WAC 173-480)			
Ambient Air Standards for Radionuclides Specific subsections: WAC 173-480-040 WAC 173-480-050 WAC 173-480-060	ARAR	These requirements establish that the most stringent federal or state ambient air quality standard for radionuclides be enforced. The WAC 173-480 standard defines the maximum allowable level for radionuclides in the ambient air, which will not cause a maximum accumulated dose equivalent of 25 mrem/yr to the whole body or 75 mrem/yr to any critical organ. However, ambient air standards under 40 CFR 61, Subparts H and I, are not to exceed amounts that result in an effective dose equivalent of 10 mrem/yr to any member of the public. Emission standards for new and modified emission units will use BARCT.	Requirements of this standard are applicable to removal actions performed at the site that could emit radionuclides to the air.
SAFETY AND HEALTH STANDARDS			
Occupational Radiation Protection (10 CFR 835)			
10 CFR 835	ARAR	This regulation establishes occupational dose limits for adults.	This regulation is applicable to the removal action.

5.4 ESTIMATED COSTS

The following is a summary of estimated costs for each removal action alternative, excluding the No Action alternative, evaluated in the EE/CA. The near-term costs for implementing the No Action alternative are negligible as no costs are expended on security, radiological surveys, maintenance activities, etc.; therefore, costs are not included.

The summarized estimate for Alternative Two is shown in Table 5-2, which includes a projection of costs over the S&M period for roof replacement and maintenance. The present-worth (discounted) cost for Alternative Two is approximately $1,220,000. The total nondiscounted cost for Alternative Two is approximately $1,670,000. Present-worth costs are used for evaluation of alternatives in the CERCLA process. Actual costs could vary. The total nondiscounted costs are presented only for information and comparison purposes.

Consistent with guidance established by the U.S. Office of Management and Budget (OMB), present-worth analysis is used as the basis for comparing costs of cleanup alternatives under the CERCLA program (OMB 1992). For purposes of this evaluation, present-worth (discounted) cost values are calculated using a discount rate of 3.2% (Marske 2003; OMB 1992) for all of the alternatives.

S&M cleanup actions often incur costs at different times. For example, construction costs (e.g., roof replacement) could be followed by periodic costs in subsequent years or decades to maintain the effectiveness of the remedy. Because of the time-dependent value of money, future expenditures are not considered directly equivalent to current expenditures. The present-worth cost method shows the amount of money required at the initial point in time (e.g., in the current year) to fund all cleanup activities

occurring over the life of the alternative. Present-worth analysis assumes that the funding set aside at the initial point in time increases in value as time goes on, similar to how money placed in a savings account gains in value as a result of interest paid on the account. Although the federal government typically does not set aside the money in this manner, the present-worth analysis is specified under CERCLA as the approach for establishing a common baseline to evaluate and compare alternatives that have costs occurring at different times. While the money actually might not be set aside, the present-worth costs are considered directly comparable for the purpose of evaluating alternative costs.

In contrast with the present-worth costs, the total nondiscounted costs do not take into account the value of money over time. The nondiscounted cost method displays the total costs occurring over the entire duration of an alternative, with no adjustment (or discounting) to reflect current year or set aside cost based on an assumed interest rate. Because nondiscounted costs do not reflect the changing value of funds over time, presentation of this information under CERCLA is for only information purposes, not for alternative selection purposes.

The present-worth (discounted) cost for Alternative Three is approximately $16,490,000. The total nondiscounted cost (approximately $16,750,000) is a summation of the D&D costs for the duration of the project and reflects potential long-term costs that have not been discounted to reflect cost in 2003 dollars (present worth).

The present-worth cost for Alternative Four is approximately $18,330,000. The total nondiscounted cost (approximately $18,850,000) is a summation of the D&D costs for the duration of the project and reflects potential long-term costs that have not been discounted to reflect cost in 2003 dollars (present worth).

Table 5-2. Total Costs for the 224-B Facility Removal Action Alternatives.

Alternative	Total Cost ($1,000)	
	Present worth	Nondiscounted
Two – S&M	1,220	1,670
Three – D&D (excluding building foundation and underlying soils/structures)	16,490	16,750
Four – D&D (including building foundation underlying soils/structures to 1 meter below foundation)	18,330	18,850

5.5 PROJECT SCHEDULE

The 224-B Facility removal action is scheduled to begin in June 2004. Only the B Plant Laydown Yard portion of the removal action is planned at this time. Demolition of the 224-B Building is expected to be deferred to coincide to the remedial action for the 221-B Canyon Facility.

The 224-B Facility sampling and analysis plan, as well as the air monitoring plan, waste management plan and removal action work plan will be submitted to EPA during project activities for review and approval and will be implemented as written and approved. These plans will be developed for the construction laydown yard only at this time. When the 224-B Building D&D is scheduled, plans will be developed and subject to EPA review and approval. No transuranic waste is expected to be generated during demolition of the laydown yard. Any transuranic waste generated during demolition activities will be shipped to WIPP for final disposition in accordance with an approved work plan and a schedule established for remedial actions, no later than September 30, 2024.

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Severe weather can create facility conditions amenable to radiological releases, and long-term aging of engineered controls can lead to eventual failure. These conditions could result in an unplanned release. This may cause a threat to human health and the environment by direct exposure to nearby personnel and the environment, and exposure to the public through airborne radioactive contaminants.

7.0 OUTSTANDING POLICY ISSUES

There are no outstanding policy issues for this removal action.

8.0 SELECTED ALTERNATIVE

The selected removal action alternative for the 224-B Facility is Alternative Three – D&D (to grade, excluding building foundation and underlying soils/structures). This alternative provides the best balance of protecting human health and the environment associated with the hazardous substance inventory within the structures, meets the removal action objectives, and provides a cost-effective option.

Alternatives Three and Four are judged to be comparable in terms of long-term protectiveness. Alternative Four potentially could provide additional long-term protection relative to Alternative Three if significant radiological inventory actually is located in the foundation. Alternative Three is comparable because this alternative leaves the stabilized facility foundation in place, thereby isolating any potential subsurface contamination remaining after removal of the main structure. Both Alternatives Three and Four would provide a removal end-state that does not preclude future actions beneath the 224-B Facility. Additionally, Alternative Three incurs significantly lower costs, and future remedial actions, if needed, would require the removal of significantly smaller quantities of backfill material placed as a result of this removal action.

Environmental sampling will be conducted in conjunction with, or following, D&D activities to assess whether the removal action objectives have been achieved. A need for follow-on actions will be determined utilizing the steps listed below:

- Implementing the approved sampling and analysis plan (SAP) for samples of the slab and soil surrounding and below the slab. The data quality objectives process will identify the contaminants of concern to be identified in the SAP.
- Obtaining analytical results from samples. Verifying that the quality assurance/quality controls specified in the SAP were met by the laboratory.
- Placing analytical data in the administrative record.
- Comparing analytical results with industrial clean-up standards. These standards will be the same as the standards used for the 200 Area remedial actions.

- If the results are below the industrial clean-up standards, then no further action is necessary under this removal action. Results will be documented in the administrative record through appropriate closure documentation.

- If the results are above industrial clean-up standards, then a work plan addendum to identify follow-on actions will be developed by the U.S. Department of Energy and approved by EPA. These actions may include no further action, performing additional removal, or deferring to a later remedial action.

Table 8-1 identifies costs for major activities to be performed as part of implementation of the selected alternative.

Table 8-1. Cost Estimate for Alternative Three: D&D (To Grade, Excluding Building Foundation and Underlying Soils/Structures).

Item	Estimated cost ($1,000)
Project planning and equipment procurement	9,100
Site mobilization and facility upgrades	260
Facility/waste characterization	2,670
Facility demolition	2,990
Waste disposal Low-Level waste Transuranic waste	 525 755
Project closeout/demobilization	230
Post D&D Surveillance and Maintenance	220
Nondiscounted Grand Total	**16,750**
Present-Worth (Discounted)	**16,490**

Note: Details on the removal alternative estimates are discussed in Marske (2003).

This decision document represents the selected removal action alternative as decontamination and demolition of the 224-B Facility based on the evaluation presented in the EE/CA and public comments. This alternative removes the potential for a release of hazardous substances that could pose a threat to public health and the environment, is protective of workers, and minimizes disposal costs. To the extent possible, by removing sources of contamination before a release occurs, this action will contribute to the efficient performance of any long term remedial actions taken in this area. This proposal was developed in accordance with CERCLA, as amended by the *Superfund Amendments and Reauthorization Act* and is not inconsistent with the *National Oil and Hazardous Substance Pollution Prevention Contingency Plan*. This decision is based on the information provided in the Administrative Record for this project.

9.0 REFERENCES

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10.0 APPROVAL SIGNATURES

The following signature pages (page 1 of 2) provide documented agreement between the DOE and the EPA for the ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE 224-B PLUTONIUM CONCENTRATION FACILITY. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is $16,490,000.

Keith Klein, Manager
Richland Operations Office
U.S. Department of Energy

6/2/04
Date

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The following signature pages (page 2 of 2) provide documented agreement between the DOE and the EPA for the ACTION MEMORANDUM FOR THE NON-TIME-CRITICAL REMOVAL ACTION FOR THE 224-B PLUTONIUM CONCENTRATION FACILITY. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal action. The total estimated cost for the project is $16,490,000.

Nick Ceto

Nick Ceto, Hanford Program Manager
U.S. Environmental Protection Agency

6/2/04
Date

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